New Hampshire
Volunteer Lake Assessment Program

Monitor's Field Manual

NEW HAMPSHIRE DEPARTMENT OF
Environmental Services
Water Division

NHDES
Limnology Center
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"Why do I need *all* these bottles?"

Introduction

Volunteers are the foundation of the New Hampshire Volunteer Lake Assessment Program (NHVLAP). This program, coordinated by the New Hampshire Department of Environmental Services (NHDES), includes lake associations, individual lake residents, and concerned lake visitors. The hard work of the trained VLAP monitors allows DES biologists to determine a lake's water quality and monitor its trends over time. The volunteers help protect their waterbody and watershed by notifying DES biologists about pollution issues that might threaten the lake. The DES interprets the data for individual lakes and ponds, which are vital to calculate New Hampshire averages. This level of assessment would not be possible without the VLAP monitors.

This manual is meant to be used as a guide for VLAP monitors. Take this manual with you when you collect samples as a reminder of the proper procedures. Note: If procedures are not followed, the data may not be valid. This manual is ***not*** a replacement for training or a DES biologist's visit. We look forward to assisting and visiting you at your lake or pond every summer.

Contacts

- New Hampshire Department of Environmental Services
  Phone: (603)271- 3503; www.des.state.nh.us/wmb/vlap
- Jody Connor, Limnology Center Director
  Phone: (603)271-3414; *jconnor@des.state.nh.us*
- Andrea LaMoreaux, VLAP Coordinator
  Phone: (603)271-2658; *alamoreaux@des.state.nh.us*
- In order to better serve our volunteers, the Limnology Center has one satellite laboratory at the following location:
  Lake Sunapee Region Lab at Colby-Sawyer College, New London, Phone: (603)526-3486; Bonnie Lewis, Lab Manager

*****If you are interested in using the satellite laboratory, please contact Bonnie Lewis and notify the VLAP Coordinator of the change.

VLAP Monitor's Field Manual

Before you sample:

Reminders

- Check the weather report-*do not* sample during thunder and lightning or excessive winds.
- Label all bottles with a waterproof pen before sampling.
- Follow all boating regulations.
- Quality Control is important. Sample between 10 am and 2 pm for accuracy and consistency.
- Always return samples to the Limnology Center before 3 pm. On Fridays, *E.coli* samples must be returned to the Limnology Center before 12:00.
- Weekend samplers should collect samples on Sunday afternoon for delivery to the Limnology Center on Monday morning.
- Most analyses have a 24 hour maximum holding period. Samples must be iced and returned to the Limnology Center within 24 hrs.

Checklist

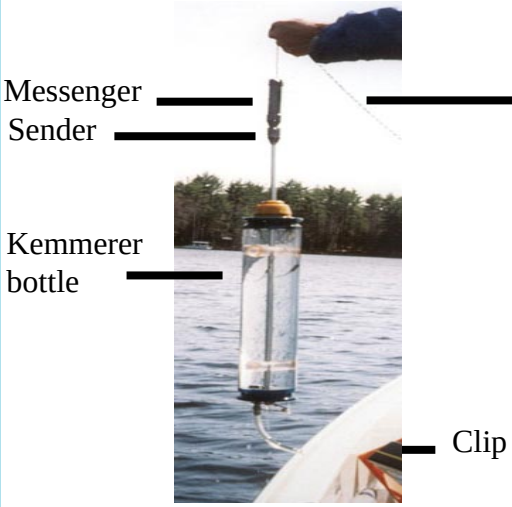
√ Kemmerer bottle with messenger and sender
√ Calibrated chain and clip
√ Bottles
  - large white (# varies per lake) } This number should be
  - small brown (# varies per lake) } the same
  - large brown (# varies per lake)
  - small sterile white (optional- for *E. coli*)

√ Bucket for chlorophyll-a composites
√ Integrated tube (optional- alternative method for chlorophyll-a)
√ Secchi disk
√ Boat
√ Anchor with enough line to anchor at the deep spot
√ Life vests for everyone on the boat
√ Data sheets and clipboard
√ Lake map with deep spot and tributaries labeled
√ Cooler with ice

On the Water:

Deep Spot Sampling

- Locate the deep spot using 3 reference points from the shoreline. This is known as *triangulation*. Fish finders also may be used.
- Properly set up the Kemmerer bottle (see figure below) and fill with water. Use the weighted bottle to sound the bottom to ensure you have located the deepest spot. Sounding may disturb the sediment. Allow the bottom to settle before collecting the deepest sample. Write the depth on the field data sheet.
- Lower the open Kemmerer bottle and sender to the desired depth. Next, drop the messenger down the chain to close the bottle and collect the in-lake samples. Check to make sure there is no sediment in the Kemmerer bottle. If you observe any sediment, start theprocess in a slightly different location (e.g. the other side of the boat). Use sample depths predetermined by a DES biologist.
- At each depth, rinse a large white bottle with a small amount of water from the Kemmerer bottle, shake, and discard. Fill the sample bottle to the neck with the collected water.
- Also fill a small brown phosphorus bottle at each depth. ***Do not rinse or overflow the small brown bottle due to the sulfuric acid preservative! It will burn hands and clothing!*** See figure below for proper level.



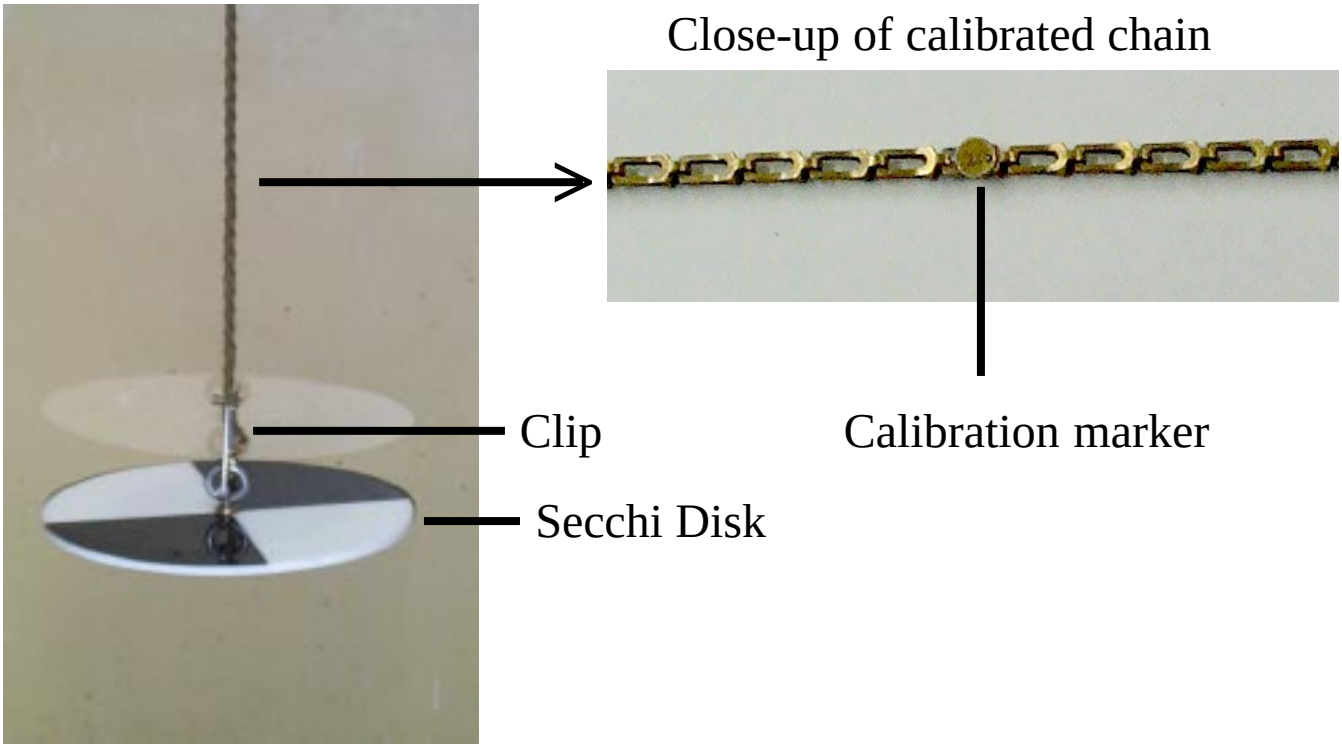
The Kemmerer bottle set-up.

Sampling for Total Phosphorus.

On the Water (cont.):

Transparency

- Securely attach the Secchi disk to the calibrated chain with the clip. (See figure below.)
- Lower the Secchi disk into the water on the shady side of the boat until it disappears. Make sure the reading is not affected by reflections or wave action. It may help to put your own shadow over the disk to block the reflection.
- Slowly pull the disk up until you can just barely see the white portion.
- Grab the chain at the water surface and determine the depth from the markers. Estimate the depth to tenths of a meter.
- This task should be repeated by you or others on the boat.
- Record the readings from each monitor on board and find the average of all the recordings.

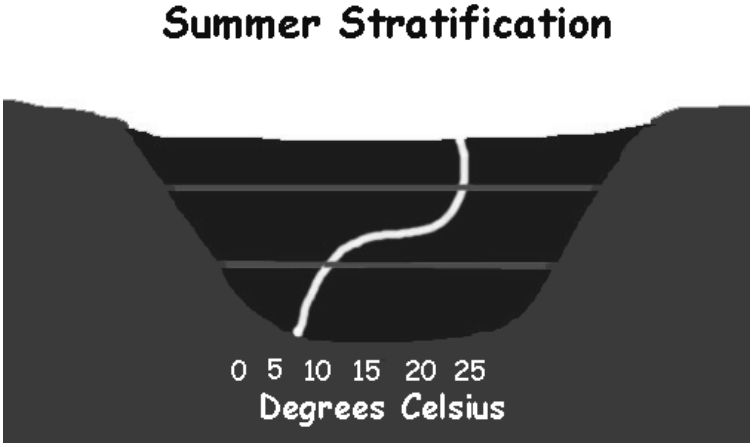


The Secchi disk set-up.

On the Water (cont.):

Chlorophyll-a sampling

- Sample from the metalimnion (thermocline) in *stratified lakes* (with thermal layers), or 2/3 the total depth in *unstratified lakes* (without thermal layers).



- **Method 1: Composite**
  - Rinse the bucket with lake water and discard.
  - Lower the Kemmerer bottle to the designated depth, as stated above.
  - Collect the water from the deepest depth and deposit about half the water into the bucket.
  - Proceed to deposit about half the water from the Kemmerer bottle from *each meter until you reach the surface.*

Example: If you take a 4m composite sample, you need an equal amount of water from the Kemmerer bottle from 4,3,2, and 1 meters.

- Rinse the large brown bottle (does not contain acid) with the water from the bucket.
- Fill the bottle with the composited water.

Method 1: Compositing with a Kemmerer bottle and bucket.

* Run through your field data sheet. If everything has been filled in, leave the deep spot and start your next task.

On the Water (cont.):

■ Method 2: Integrated Tube

- Rinse the bucket with lake water and discard.
- Connect the calibrated chain to the weighted end of the Integrated tube (See figure below).
- Lower both the weighted end and chain to the same depth. *Do not allow slack in the tube or chain.*
- Crimp the end of the tube tightly and haul the weighted end up <u>by the chain only</u>, not the tube itself.
- Place the weighted end into the bucket and uncrimp the tube.
- Lift the <u>uncrimped</u> end above your head so the open end is always higher than the water level in the tube. This allows the water to drain quickly.
- Rinse the <u>large brown</u> bottle (does not contain acid) with the water, discard, and then fill the bottle.

Method 2: The Integrated Tube and calibrated chain.

* Run through your field data sheet. If everything has been filled in, leave the deep spot and start your next task.

On the Shore:

Bacteria Sampling (optional)

- Obtain a *sterile* small white bottle with a lot number sticker on the cap. Label it with the lake name, site name, date, and time.
- Remove the cap once you have reached the site and are ready to collect the sample. *Avoid touching the neck, inside the bottle or cap to prevent contamination.*
- Sample about knee deep in the lake water or midway between the top and bottom of a flowing stream.
- Point the mouth of the bottle towards the water surface, submerge completely and scoop the water in an upward "U- shaped" motion *away* from you.
- Avoid getting sediment or surface debris in the sample.

Tributary Sampling

Reminders:

- Do not sample if the tributary is not flowing or too shallow.
- Do not sample if the sediment has been disturbed. You may sample upstream in an undisturbed area.
- Check your old reports and lake map to repeat the same sampling locations each month.

- Label one (1) large white and one (1) small brown bottle per sampling site.
- Rinse the large white bottle by scooping into the flow, then shake and discard the water downstream.
- Fill the large white bottle and use it to fill the small brown bottle. *Do not rinse or overflow the small brown bottle. It contains sulfuric acid as a preservative!*
- Top off the large white bottle.
- Repeat the steps with all tributary sampling sites.

Returning to the Lab:

- Indicate all new sampling stations (stations that have not been sampled in the past) on a map and fill out a station identification form. Submit this information to the lab with your samples.
- Transport all samples in a cooler with ice.
- Samples must be returned and analyzed *within 24 hours of the collection time* for valid results.
- Samples can be returned to the lab between *8 am and 3 pm.*
- On Fridays, *E.coli* samples must be returned to the Limnology Center before 12:00.
- Remember to include the full name of all the monitors on the field data sheet. You *all* deserve credit!

Going the Extra Mile:

- Make comments on the data sheet of anything unusual such as extreme weather, construction projects, algae blooms, water color, etc. These comments help us to analyze your lake's data.
- Become a Weed Watcher by contacting us at (603) 271-2248 or *asmagula@des.state.nh.us* to further protect your lake.
- We are asking volunteers to collect fish for mercury analysis. DES is working in cooperation with the NH Department of Health and Human Services to quantify the amount of mercury in freshwater fish that may be used for consumption. For information, please call our office at (603)271-2963.
- Feel free to ask questions, we are happy to help you!